[JP,09-169971,A]

CLAIMS

[Claim(s)]

[Claim 1] When it is the abrasive grain of the cubic boron nitride which has a high toughness value with low bulk specific gravity, and the distribution of grain size based on a convention of JIS-B4130 belongs to the range of #325/400-#60/80 and the maximum grain size (the minimum numeric value) of each partition of the grain size based on this convention is set to chi, bulk specific gravity and toughness are the following type (1) and (2):a2, respectively. <= Bulk specific gravity <= a1 (1)
b2 <= Toughness <= b1 (2)
(However) a1=2.581x10-9chi3-2.894x10-7chi2-9.491x10-4chi+1.892a2=4.316x10-9chi3-1.662x10-6chi2-5.992x10-4chi + 1.714b1=3.245x10-6chi3-2.566x10-3chi2+7.125x10-1chi+9.264b2=3.245x10-6chi3-2.566x10-3chi2+7.125x10-1chi-6.736
The cubic boron-nitride abrasive grain characterized by being satisfied.

[Claim 2] How to manufacture the cubic boron-nitride abrasive grain according to claim 1 characterized by using the raw material mixture which blended the inactive component into this raw material mixture at cubic boron-nitride composition of further 5 - 50 capacity % in the approach of compounding a cubic boron-nitride abrasive grain by holding the raw material mixture which blended the catalyst for cubic boron-nitride composition with the hexagonal boron nitride under elevated-temperature high pressure.

[Claim 3] The grinding stone which consists of a cubic boron-nitride abrasive grain according to claim 1.

[Claim 4] Coated abrasives which come to contain a cubic boron-nitride abrasive grain according to claim 1 as abrasives.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]
[Field of the Invention] This invention relates to the abrasive grain of the cubic boron nitride which has a high toughness value with low bulk specific gravity, its manufacture approach, the grinding stone that consists of such an abrasive grain, and the coated abrasives which contain such an abrasive grain as abrasives.

[0002]
[Description of the Prior Art] A cubic boron nitride (it is hereafter called cBN for short) is manufactured by processing a hexagonal boron nitride (it being hereafter called hBN for short) with the elevated-temperature high pressure which is the thermodynamics conditions for stability of cBN. A cBN particle has the hardness which ranks second to a diamond, and moreover, since chemical stability, especially the stability over ******** material are superior to the diamond, it is used as grinding abrasive grains, such as a grinding stone and coated abrasives.

[0003] About the process of a cBN particle, including JP,59-57905,A, JP,59-73410,A, and JP,59-73411,A, many proposals are made and the cBN particle obtained by these general processes holds the hardness and chemical stability which were excellent as mentioned above. However, although these cBN particles are satisfactory for using it for a usual electroplated grinding wheel or a usual metal bonded grinding wheel, it cannot be said that it is suitable for the grinding abrasive grain application as which sharpness is required. For the low bulk specific gravity of the cBN particle used for the grinding abrasive grain with which sharpness is demanded, i.e., a configuration, to be sharp, and to be precise as texture of cBN is desired.

[0004] These people performed patent application for the process which carries out elevated-temperature high-pressure processing of the system of reaction which added the source of C, the source of Si and hydrogenation alkali, a hydrogenation alkaline earth, or other cBN composition catalysts to hBN at a header and the point, as a result of repeating examination for the purpose of offering a cBN particle with comparatively precise texture with a sharp and configuration (JP,2-35931,A). It turned out that the cBN particle manufactured by the approach indicated by JP,2-35931,A has high bulk specific gravity and high toughness, the appearance configuration side of a particle is based on (111), and it has the precise, transparent, and sharp edge, and an edge will become round and sharpness will become slow if grinding is continued although sharpness with the good time of using for a grinding stone is shown.

[0005] Moreover, the method of manufacturing a long and slender cBN particle is indicated by JP,51-37897,A as the exception method for obtaining a cBN particle with a sharp configuration by contacting a sintered compact mutually and processing it beforehand, under a powdered moldings or the temperature suitable for composition of cBN, and the conditions of a pressure, without carrying out powder mixing of hBN and the catalyst for cBN composition. According to this approach, when a hBN sleeve and a catalyst core are arranged and pressurized, a crack is produced and warmed to a hBN sleeve and a catalyst dissolves, a dissolution catalyst enters into that crack section, and it is presumed that a long and slender cBN particle is obtained as a result. However, if the required pressure of 5GPa(s) is put in case a cBN particle is usually compounded, even if a crack arises to a hBN sleeve at the time of pressurization, 1 ********** crack will be compressed like the part which a crack did not produce, and it will be thought that it is difficult for a melting catalyst to enter preferentially. Moreover, in order to divide and arrange the hBN section and the catalyst section by this approach, converted quantity is industrially disadvantageous few.

[0006]
[Problem(s) to be Solved by the Invention] The purpose of this invention improves the trouble of the above Prior arts, and texture is precise transparence. Sharp of a configuration, i.e., bulk specific gravity, is low, therefore the sharpness when using as a grinding abrasive grain is good. And when a grinding load is small, and a cutting edge decreases and resistance becomes large, it has the property of saying the cutting edge from spontaneous generation that a lifting and a new cutting edge appear and good sharpness continues, and it is in offering a cBN abrasive grain useful as a grinding abrasive grain.

[0007] Furthermore, other purposes of this invention are to offer the industrial advantageous manufacture approach of such an abrasive grain, the grinding stone which consists of such an abrasive grain, and the coated abrasives which have such an abrasive grain as abrasives.

[0008]
[Means for Solving the Problem] According to this invention, it is the abrasive grain of the cubic boron nitride which has a high toughness value with low bulk specific gravity. When the distribution of grain size based on a convention of JIS-B4130 belongs to the range of #325/400-#60/80 and the maximum grain size (the minimum numeric value) of each partition of the grain size based on this convention is set to chi, Bulk specific gravity and toughness are the following type (1) and (2):a2, respectively. <= Bulk specific gravity <= a1 (1)

b2 <= Toughness <= b1 (2)

(However) a1=2.581x10-9chi3-2.894x10-7chi2-9.491x10-4chi+1.892a2=4.316x10-9chi3-1.662x10-6chi2-5.992x10-4chi + 1.714b1=3.245x10-6chi3-2.566x10-3chi2+7.125x10-1chi+9.264b2=3.245x10-6chi3-2.566x10-3chi2+7.125x10-1chi-6.736
The cubic boron-nitride abrasive grain characterized by being satisfied is offered.

[0009] Furthermore, according to this invention, in the approach of compounding a cubic boron-nitride abrasive grain, the method of manufacturing the above-mentioned cubic boron-nitride

abrasive grain characterized by using the raw material mixture which blended the inactive component into this raw material mixture at cubic boron-nitride composition of further 5 - 50 capacity % is offered by holding the raw material mixture which blended the catalyst for cubic boron-nitride composition with the hexagonal boron nitride under elevated-temperature high pressure.

[0010] Furthermore, according to this invention, the grinding abrasive grain which consists of the above cBN abrasive grains is offered. Furthermore, according to this invention, the coated abrasives which contain the above cBN abrasive grains as abrasives are offered.

[0011]
[Embodiment of the Invention] The cBN abrasive grain of this invention is characterized by having the comparatively low specific bulk specific gravity specified as a function of the particle size distribution, and a specific, comparatively high toughness value. That is, it is characterized by the cBN abrasive grain of this invention going into the range in which bulk specific gravity and toughness are specified by the above (1) and (2), respectively, when the distribution of grain size based on a convention of JIS-B4130 belongs to the range of #325/400-#60/80 and the maximum grain size (the minimum numeric value) of each partition of the grain size based on this convention is set to chi.

[0012] The particle-size-distribution property (decided by particle size analysis using a specific electro form screen) of the particle belonging to the partition and each grain-size partition of the grain size of a cBN particle is specified in JIS-B4130 as the following table 1 (however, thing mentioned above [range / of grain-size partition #325/400-#60/80 / relevant to / partition / of grain size / the invention in this application / Table 1]).

[0013]

Table 1]

JIS-B4130に規定される粒度の区分	1段目のふるい	2段目のふるい		3段目のふるい			4段目のふるい
	99.9%通過しなければならないふるい	一定量以上とどまってはいけないふるいとその量		一定量以上とどまらなければならないふるいとその量		通過してもよい最大の量	2%以上通過してはならないふるい
	μm	μm	%	μm	%	%	μm
60/80	384	271	8	181	90	8	127
80/100	271	197	10	151	87	10	107
100/120	227	165	10	127	87	10	90
120/140	197	139	10	107	87	10	75
140/170	165	116	11	90	85	11	65
170/200	139	97	11	75	85	11	57
200/230	116	85	11	65	85	11	49
230/270	97	75	11	57	85	11	41
270/325	85	65	15	49	80	15	-
325/400	75	57	15	41	80	15	-

The maximum grain size (the minimum numeric value) of each partition of the above-mentioned

grain size is set to chi. For example, in the grain-size partition of #60/80, it is chi= 325 in chi= 60 and the grain-size partition of #140/170 in chi= 140 and the grain-size partition of #325/400.

[0014] Corresponding to the grain size chi of each of that grain-size partition, as for the cBN abrasive grain of this invention, bulk specific gravity and toughness have satisfied the following formula (1) and (2), respectively.

a2 <= Bulk specific gravity <= a1 (1)

b2 <= Toughness <= b1 (2)

For example, while the particle size distribution of the sample of a cBN abrasive grain are covering the range of grain-size partition #140/170-#100/120, the particle belonging to each of all the grain-size partitions within the limits of this (a total of three grain-size partitions) has satisfied the above-mentioned formula (1) and (2).

[0015] The bulk specific gravity of the cBN abrasive grain of this invention is lower than the cBN abrasive grain currently generally used, and lower than the cBN abrasive grain with which toughness is generally also used generally. When the bulk specific gravity of the cBN abrasive grain of this invention specified by the above-mentioned formula (1) and (2) and the tolerance of toughness are shown as a numeric value with the bulk specific gravity and toughness of a cBN abrasive grain which are generally used, it is as in the following table 2.

[0016]

[Table 2]

粒度区分	物性項目	本発明のｃＢＮ砥粒	特開平2-35931に記載されているｃＢＮ砥粒
60/80	かさ比重	1.81～1.69	1.94～1.84
	ﾀﾌﾈｽ値	41～29	54～44
80/100	かさ比重	1.80～1.68	1.93～1.83
	ﾀﾌﾈｽ値	50～38	63～53
100/120	かさ比重	1.78～1.66	1.91～1.81
	ﾀﾌﾈｽ値	56～44	69～59
120/140	かさ比重	1.76～1.65	1.90～1.80
	ﾀﾌﾈｽ値	62～50	75～65
140/170	かさ比重	1.74～1.63	1.88～1.78
	ﾀﾌﾈｽ値	66～54	79～69
170/200	かさ比重	1.71～1.60	1.87～1.77
	ﾀﾌﾈｽ値	69～57	82～72
200/230	かさ比重	1.69～1.58	1.85～1.75
	ﾀﾌﾈｽ値	73～61	85～75
230/270	かさ比重	1.67～1.56	1.84～1.74
	ﾀﾌﾈｽ値	75～63	88～78
270/325	かさ比重	1.65～1.54	1.83～1.73
	ﾀﾌﾈｽ値	77～65	90～80
325/400	かさ比重	1.62～1.51	1.81～1.71
	ﾀﾌﾈｽ値	79～67	92～82

[0017] Here, "bulk specific gravity" is called for by the measuring method with which the amount of sampling was set to 20.0**0.1g among JIS-R6126 "the bulk specific gravity test

approach of artificial abrasive", and it set 8.0**0.10ml and fall distance to 95.0**1.0mm for cylinder volume. Moreover, after "toughness" puts the constant rate and one shot of **** which were carried out the screen exception into a capsule with a volume of 2ml and carries out fixed time amount (30.0 **0.3 seconds) grinding by the sieve mesh specified with grain size, it is carried out a screen exception by the specified sieve mesh, and is expressed with the sample residual weight percent on a sieve mesh.

[0018] If the bulk specific gravity of a cBN abrasive grain becomes large across the above-mentioned tolerance (i.e., if particle shape becomes BUROKKI), the sharpness of an abrasive grain will worsen. If the minimums of the above-mentioned bulk-specific-gravity tolerance are requirements required to maintain grindability ability, especially a high grinding ratio and bulk specific gravity is lower than tolerance, the shape of flat and a rate of an anomaly-like grain which is needlelike will increase, and grindability ability, especially a grinding ratio will fall.

[0019] although toughness has many places depending on the configuration of an abrasive grain, in order for the upper limit of the toughness in each grain size to make sharpness maintain -- an abrasive grain -- strength required to raise the cutting edge from spontaneous generation of a cutting edge -- if toughness becomes large exceeding tolerance, the cutting-edge operation from spontaneous generation will stop being able to happen easily, and sharpness will fall. On the other hand, it is the minimum reinforcement required in order that the minimum of the toughness in each grain-size partition may make fitness maintain the cutting edge from spontaneous generation, and if it becomes low from this toughness permission minimum, breakage of an abrasive grain will become early and grindability ability, especially a grinding ratio will fall.

[0020] The abrasive grain with it is obtained for the first time, when the particle size distribution are in the above-mentioned predetermined range and the bulk specific gravity and toughness of a particle in each grain-size partition satisfy the above-mentioned formula (1) and (2), respectively. [the good and sharpness made into the purpose in this invention and] [long lasting]

[0021] The cBN abrasive grain of the invention in this application can be obtained by adding an inactive component to cBN composition still like an alumina in the approach of setting hBN under an elevated-temperature high-pressure condition, in the start mixture which blended the catalyst for cBN composition with hBN according to a conventional method. That is, in the process in which the cBN particle generated under elevated-temperature high pressure will grow if a component like an alumina inactive to the cBN composition other than hBN and the catalyst for cBN composition is added, if a particle contacts inerts, it will not grow up in the direction any more, consequently a cBN particle with a sharp configuration will be obtained in the sample space of cBN composition.

[0022] The purity usually marketed as hBN can use 98% or more of thing. As a catalyst for cBN composition, alkali metal, such as (1) Li, these nitrides (Li3N etc.), Double nitrides (Li3BN2 etc.) (2) Alkaline earth metal, such as calcium, Sr, Mg, and Ba, These nitrides (calcium3N2, Sr3N2, Mg3N2, Ba3N2, etc.), The compound nitrides (LiCaBN2, LiBaBN2, etc.) of double nitrides (calcium3 B-2 N4, Sr3 B-2 N4, Mg3 B-2 N4, Ba3 B-2 N4, etc.) (3) alkali and alkaline earth metal can be used. The compound nitride of (3) alkali and alkaline earth metal is desirable at the

point that a growth phase with the stability of a catalyst it is good and precise and transparent in these catalysts for cBN composition is obtained easily.

[0023] The amount of the catalyst for cBN composition used has desirable 5 - 50 weight section to the hBN100 weight section. As a component inactive to cBN composition, neither a phase transition nor decomposition is carried out under the elevated-temperature high pressure of a cBN composition region, and the catalyst for cBN composition and the matter which does not react are used, and an aluminum oxide, a zirconium dioxide, a mullite, silicon carbide, etc. are mentioned as the example. An aluminum oxide is desirable when a price, the ease of receiving, etc. are taken into consideration. Although especially the gestalt of inerts is not limited, a granular object is used fundamentally and, generally the permission size range is about 5-5,000 micrometers.

[0024] The amount of the component used inactive to cBN composition is five to 50 capacity [of sample space] %. The effectiveness of the formation of configuration Sharp is small in the amount used being under 5 capacity %. Moreover, since the converted quantity of cBN will become less if 50 capacity % is exceeded, it becomes disadvantageous industrially. The conditions at the time of carrying out elevated-temperature high-pressure processing of the raw material mixture which blended the catalyst for cBN composition and the above-mentioned inerts with hBN are the same as usual, and are good, and, generally optimum dose selection is made a pressure 4 - 6GPa, the temperature of 1,400-1,600 degrees C, and in 5 minutes - time amount 10 hours. The most desirable conditions are about 5 pressure GPa(s), temperature [of about 1,450 degrees C], and time amount about 15 minutes.

[0025] The cBN abrasive grain of this invention is useful as a grinding abrasive grain as mentioned above. A grinding stone (vitrified ** electrodeposition and metal bond), coated abrasives, etc. are more specifically mentioned. Moreover, the front face of a cBN particle is made to be mainly able to cover metals, such as nickel and cobalt, and it can also use as a resinoid grinding wheel.

[0026]
[Example]

[0027] Hereafter, this invention is more concretely explained about an example.

Example 1 (preparation of an abrasive grain)

It added so that it might become 20 capacity % of sample space in the hBN(UHP[by Showa Denko K.K.]- 1, mean-particle-diameter [of 8-10 micrometers], 98% of purity) 100 weight section as a cBN composition catalyst about the LiCaBN2 10 weight section and an aluminum oxide (WA[by Showa Denko K.K.] # 180), and the sample was fabricated. carrying out high-pressure high temperature processing of the sample at 5GPa(s) and 1500 degrees C -- yellow -- the transparent cBN particle was able to be obtained. The obtained cBN particle was processed and grain size was adjusted to the JIS-B4130 grain-size partitions 80/100 and 230/270. The bulk specific gravity and toughness of a particle of each grain-size partition were as follows.

Grain-size partition Bulk specific gravity Toughness 80/100 1.74 42230/270 1.62 73

[0028] The example 1 (preparation of an abrasive grain) of a comparison

An aluminum oxide was not added and also the cBN particle was obtained by the same approach as an example 1. The bulk specific gravity and toughness of a particle of the grain-size partition of the obtained cBN particle and each grain-size partition were as follows.

Grain-size partition Bulk specific gravity Toughness 80/100 1.88 45230/270 1.78 78

[0029] The example 2 (preparation of an abrasive grain) of a comparison

pressure 6.5GPa and the temperature of 1650 degrees C -- high pressure -- high temperature processing was carried out, and also the cBN particle was obtained by the same approach as the example 1 of a comparison. The bulk specific gravity and toughness of a particle of the grain-size partition of the obtained cBN particle and each grain-size partition were as follows.

Grain-size partition Bulk specific gravity Toughness 80/100 1.90 34230/270 1.72 60

[0030] The example 3 (preparation of an abrasive grain) of a comparison

The particle which has a still more sharp configuration was extracted intensively, having applied the cBN particle obtained in the example 1 to the configuration separator. The bulk specific gravity and toughness of a particle of the grain-size partition of the obtained cBN particle and each grain-size partition were as follows.

Grain-size partition Bulk specific gravity Toughness 80/100 1.63 31230/270 1.51 58

[0031]
Example 2 (creation of a grinding stone segment)

Using the cBN abrasive grain (grain size 80/100, bulk specific gravity 1.74, toughness 42) obtained in the example 1, by the following combination formula, mixture was prepared, actual baking was carried out at 950 degrees C after pressing by 150 degrees C, and the grinding stone segment was created. The porosity of the grinding stone segment after baking was 30 capacity %.

cBN particle 50 capacity % hoe silic acid system vitrified bond 20 capacity % phenol resin 10 capacity %

[0032] Example 3 (creation of a grinding stone segment)

Using the cBN abrasive grain (grain size 230/270, bulk specific gravity 1.62, toughness 73) obtained in the example 1, by the following combination formula, mixture was prepared, actual baking was carried out at 950 degrees C after pressing by 150 degrees C, and the grinding stone segment was created. The porosity of the grinding stone segment after baking was 30 capacity %.

cBN particle 50 capacity % hoe silic acid system vitrified bond 20 capacity % phenol resin 10 capacity %

[0033] The example 4 (creation of a grinding stone segment) of a comparison

Using the cBN abrasive grain (grain size 80/100, bulk specific gravity 1.88, toughness 45) obtained in the example 1 of a comparison, by the following combination formula, mixture was prepared, actual baking was carried out at 950 degrees C after pressing by 150 degrees C, and the grinding stone segment was created. The porosity of the grinding stone segment after baking was 30 capacity %.

cBN particle 50 capacity % hoe silic acid system vitrified bond 20 capacity % phenol resin 10 capacity %

[0034] The example 5 (creation of a grinding stone segment) of a comparison

Using the cBN abrasive grain which has the grain size 80/100, the bulk specific gravity 1.90, and toughness 34 which were obtained in the example 2 of a comparison, by the following combination formula, mixture was prepared, actual baking was carried out at 950 degrees C after pressing by 150 degrees C, and the grinding stone segment was created. The porosity of the grinding stone segment after baking was 30 capacity %.

cBN particle 50 capacity % hoe silic acid system vitrified bond 20 capacity % phenol resin 10 capacity %

[0035] The example 6 (creation of a grinding stone segment) of a comparison

Using the cBN abrasive grain which has the grain size 80/100, the bulk specific gravity 1.63, and toughness 31 which were obtained in the example 3 of a comparison, by the following combination formula, mixture was prepared, actual baking was carried out at 950 degrees C after pressing by 150 degrees C, and the grinding stone segment was created. The porosity of the grinding stone segment after baking was 30 capacity %.

cBN particle 50 capacity % hoe silic acid system vitrified bond 20 capacity % phenol resin 10 capacity %

[0036] The example 7 (creation of a grinding stone segment) of a comparison

Using the cBN abrasive grain (grain size 230/270, bulk specific gravity 1.78, toughness 78) obtained in the example 1 of a comparison, by the following combination formula, mixture was prepared, actual baking was carried out at 950 degrees C after pressing by 150 degrees C, and the grinding stone segment was created. The porosity of the grinding stone segment after baking was 30 capacity %.

cBN particle 50 capacity % hoe silic acid system vitrified bond 20 capacity % phenol resin 10 capacity %

[0037] The example 8 (creation of a grinding stone segment) of a comparison

Using the cBN abrasive grain which has the grain size 230/270 obtained in the example 2 of a comparison, bulk specific gravity 1.72, and toughness 60, by the following combination formula, mixture was prepared, actual baking was carried out at 950 degrees C after pressing by 150 degrees C, and the grinding stone segment was created. The porosity of the grinding stone segment after baking was 30 capacity %.

cBN particle 50 capacity % hoe silic acid system vitrified bond 20 capacity % phenol resin 10 capacity %

[0038] The example 9 (creation of a grinding stone segment) of a comparison

Using the cBN abrasive grain which has the grain size 230/270 obtained in the example 3 of a comparison, bulk specific gravity 1.51, and toughness 58, by the following combination formula, mixture was prepared, actual baking was carried out at 950 degrees C after pressing by 150 degrees C, and the grinding stone segment was created. The porosity of the grinding stone segment after baking was 30 capacity %.

cBN particle 50 capacity % hoe silic acid system vitrified bond 20 capacity % phenol resin 10 capacity %

[0039] After pasting aluminum base metal and grinding-stone-izing the grinding stone segment created in creation, the grinding test above-mentioned examples 2 and 3, and the examples 4-9 of a comparison of a grinding stone according to a conventional method, the grinding trial was performed on condition that the following.

Grinding stone: 14A1 form, 150Dx125Jx15Tx5Ux3Xx76.2H grinder : Axis-of-abscissa surface grinder (wheel spindle motor 3.7kW)

infeed Grinding-fluid [of 20 or 30 micrometers]: The liquid only for JIS W two-sort cBN(s), 50 dispensing solutions, and a 9 l/min grinding result are shown in Table 3 - 6. : 200mm length [of SKII-grinding-ed / 51, (HRC 62-64), and / sides] x 100mm width-of-face grinding method: Wet flat-surface traverse-grinding method grinding conditions : [**-ed material grinding stone peripheral-velocity 1800 m/min and table rate 15 m/min cross delivery 2 mm/pass, and]

[0040]

[Table 3]

粒度８０／１００、切込み２０μmのとき

種　　類		実施例２	比較例４	比較例５	比較例６
研　削　比		937	935	873	620
研削動力(W)		1330	1810	2000	1980
面粗さ	平行方向Ra(μm)	0.27	0.28	0.25	0.25
	直角方向Ra(μm)	0.89	0.93	0.87	0.87

[0041]

[Table 4]

粒度８０／１００、切込み３０μmのとき

種　　類		実施例２	比較例４	比較例５	比較例６
研　削　比		658	674	628	550
研削動力(W)		1690	2170	2250	2280
面粗さ	平行方向Ra(μm)	0.28	0.28	0.27	0.27
	直角方向Ra(μm)	1,32	1.25	1.30	1.35

[0042]

[Table 5]

粒度２３０／２７０、切込み２０μmのとき

種　類		実施例３	比較例７	比較例８	比較例９
研　削　比		2411	2358	2085	1990
研削動力(W)		580	710	810	820
面粗さ	平行方向Ra(μm)	0.18	0.19	0.18	0.18
	直角方向Ra(μm)	0.75	0.76	0.68	0.75

[0043]
[Table 6]

粒度２３０／２７０、切込み３０μmのとき

種　類		実施例３	比較例７	比較例８	比較例９
研　削　比		929	945	903	827
研削動力(W)		670	940	1010	1030
面粗さ	平行方向Ra(μm)	0.21	0.22	0.20	0.21
	直角方向Ra(μm)	1.70	1.67	1.61	1.55

[0044]
[Effect of the Invention] It has the property said that a lifting and a new cutting edge appear the cutting edge from spontaneous generation when the sharpness when the texture of the cBN abrasive grain of this invention being precise transparence, and Sharp's, i.e., bulk specific gravity, configuration being low, therefore using as a grinding abrasive grain is good, and a grinding load is moreover small, and a cutting edge decreases and resistance becomes large, and good sharpness continues. Therefore, this cBN abrasive grain is suitable for a grinding abrasive grain, and useful as a grinding stone, coated abrasives, etc.

[Translation done.]